

SEVCHENKO, A.N.,; ZYAT'KOV, I.P., akademik

Infrared spectra of asymmetric diacyl peroxides. Dokl. AN SSSR 136  
no. 5:1104-1107 F '61. (MIRA 14:5)

1. Belorusskiy gos. universitet im. V.I. Lenina. 2. AN BSSR (for  
Sevchenko).

(Peroxides—Spectra)

OL'DEKOP, Yu.A.; MOYSEYCHUK, K.L.; SEVCHENKO, A.N., akademik;  
ZYAT'KOV, I.P.

1,1-Bis-acylperoxy-dicyclohexyl peroxides. Dokl. AN SSSR  
139 no.5:1117-1120 Ag. '61. (MIRA 14:8)

1. Institut fiziko-organicheskoy khimii AN BSSR i Belorusskiy  
gosudarstvennyy universitet im. V.I.Lenina. 2. AN BSSR (for  
Sevchenko).

(Peroxides)

S/048/62/026/001/001/018  
B125/B104

AUTHORS: Sevchenko, A. N., Shishlovskiy, A. A.  
TITLE: Life and work of Sergey Ivanovich Vavilov  
PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,  
v. 26, no. 1, 1962, 7-13.

TEXT: S. I. Vavilov was born in Moscow on March 24, 1891. After graduating from a commercial school he enrolled at the fiziko-matematicheskii fakul'tet Moskovskogo universiteta (Division of Physics and Mathematics of the Moscow State University). He was taught physics by P. N. Lebedev, A. A. Eykhenval'd, N. A. Umov; mechanics by N. Ye. Zhukovskiy and S. A. Chaplygin; mathematics by B. K. Mlodzeyevskiy, D. F. Yegorov, N. N. Luzin; botany by K. A. Timiryazev; chemistry by N. D. Zelinskiy; astronomy by P. K. Shternberg; and crystallography by V. I. Vernadskiy. The early scientific work of student Vavilov at P. N. Lebedev's laboratory was supervised by P. P. Lazarev, also a student of the latter. Vavilov's paper "Thermal bleaching of dyes", the result of an investigation conducted in the underground laboratory, set up after the student

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S/048/62/026/001/001/018  
B125/B104

Life and work of Sergey...

agitations of 1911, won him the first acknowledgement. After graduation in 1914 he rejected, for political reasons, an appointment to the kafedra fiziki Moskovskogo universiteta (Department of Physics of the Moscow University), and carried on studies on radiation during his military service of 1914-1918. After going through the degrees of magister and docent, he headed the kafedra obshchey fiziki (Department of General Physics) as a professor. At the same time, he was professor of physics and theoretical illumination engineering at the Moskovskoye vyssheye tekhnicheskoye uchilishche (Moscow School of Higher Technical Education) and other such institutes. Between 1918 and 1930 he was the head of the otdel fizicheskoy optiki v institute fiziki i biofiziki Narkomzdrava (Department of Physical Optics at the Institute of Physics and Biophysics of the People's Commissariat for Health). He was appointed both Corresponding Member and Real Member of the Academy of Sciences USSR in 1931 and 1932, respectively. Likewise in 1932, he was appointed director of the Fizicheskii institut Akademii nauk (Physics Institute of the Academy of Sciences) and scientific head of the Gosudarstvennyy opticheskii institut (State Optical Institute). Among hundreds of scientific papers, more than a hundred deal with physical optics, ✓

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3/048/62/026/001/001/018  
B125/B104

Life and work of Sergey...

especially with light energy and its effect on matter. Between 1922 and 1924, Vavilov together with V. L. Levshin studied the dependence of polarization of the luminescence of solutions on the viscosity and nature of dyes. Always jointly with Levshin, he investigated the dependence of the maximum degree of polarization on the wavelength of the exciting light, the effect of the concentration of the luminescent substance on the yield, and the luminescence (discovered by Aspirant P. A. Cherenkov in 1932) of solvent in the gamma irradiation of uranium salt solutions. The theory of this phenomenon was formulated by I. Ye. Tamm and I. M. Frank. Vavilov developed a visual method of measuring the quantum fluctuations of light; luminescence lamps; methods of quantitative luminescence analysis for use in engineering, medicine, and agriculture; luminescence and practical applications of crystal phosphors. Together with Ye. M. Brumberg he designed a new type of luminescence microscope. Vavilov spent much of his efforts in training young scientists and scientific teams. He won such collaborators as V. A. Fabrikant, I. M. Frank, B. Ya. Sveshnikov, Ye. M. Brumberg, A. A. Shishlovskiy, the aspirants P. A. Cherenkov, N. A. Dobrotin, L. G. Groshev, I. A. Khvostikov, and the luminescence specialists P. P. Feofilov, M. D. Galanin, E. I. Adirovich,

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S/048/62/026/001/001/018  
B125/B104

Life and work of Sergey...

V. V. Antonov-Romanovskiy, M. A. Konstantinova-Shlezinger, Z. A. Trapeznikova, V. V. Zelinskiy, N. A. Tolstoy, A. M. Bonch-Bruyevich, M. N. Alentsev et al. Vavilov was greatly concerned with introducing scientific methods into industrial production processes. Under his supervision, the Fizicheskiy institut im. P. N. Lebedeva (Physics Institute imeni P. N. Lebedev), formerly a modest laboratory of physics, expanded into one of the leading research institutes of the Soviet Union. Vavilov also devoted much of his efforts to the organization of the FIAN and of the State Optical Institute, and promoted nuclear physics. He participated in the reorganization of the Academy of Sciences and in the coordination of scientific activities in the various Soviet Republics. His name is also linked with methodology, history of physics, and popular scientific literature. Large scientific centers concerned with problems of luminescence now exist or are being built at Kiyev, Tartu, Minsk, Chelyabinsk, Tomsk, Odessa, and other cities.

*duh 1951*

Card 4/4

SEVCHENKO, A.N.

Luminescence spectra of porphyrins. Izv. AN SSSR. Ser.  
fiz. 26 no.1:53-60 Ja '62. (MIRA 15:2)  
(Luminescence)  
(Porphyrins--Spectra)

SEVCHENKO, A.M. [Sevchenko, A.M.]; MILCHENKO, D.S. [Mordika, D.S.]

Mirror symmetry and the nature of the electron absorption spectra of uranyl compounds. Part 2. Vestsi AN BSSR. Ser. Fiz.-tekh. nav. no.4:43-51 '63.

(U.S. 17:17)



STRAIKOVA, T.I.; GURINOVICH, G.I.; SEVCHENKO, A.G.

Effect of the acidity of the medium on the optical properties of  
porphyrins. Dokl. AN BSSR 7 no.11:736-739 H '63. (MIRA 17:9)

1. Institut fiziki AN BSSR.

L 10759-63 EWP(j)/EPF(c)/EWT(1)/  
EWT(m)/BDS--AFFTC/ASD--Pc-4/Pr-4--RM/WW  
ACCESSION NR: AP3002789

S/0051/63/014/006/0809/0812

AUTHOR: Gurinovich, G. P.; Sarzhevskiy, A. M.; Sevchenko, A. N.

TITLE: New data on the dependence of polarization rate on the wavelength of the fluorescence

SOURCE: Optika i spektroskopiya, v. 14, no. 6, 1963, 809-812

TOPIC TAGS: polarization, fluorescence, phthalimides

ABSTRACT: To prove a previous assertion of the authors that the polarization of complex molecules depends on the absorption and emission frequencies, polarization rate has been measured in several phthalimides as a function of excitation and luminescence wavelength. A careful analysis of the dependence of fluorescence spectra on excitation wavelength for 3-monomethylaminophthalimide in plexiglass showed that when the compound was excited with wavelengths of 436, 405, and 365 mμ the emission spectra nearly coincide. The change in polarization rate with respect to the emission spectrum amounts to 6.5% over

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L-10759-63

ACCESSION NR: AP3002789

an interval of  $6000\text{ cm}^{-1}$ , a magnitude in good agreement with previous data. It was shown that when 3-monomethylamino-N-methylphthalimide in glycerin was excited with wavelengths of 436 and 405 m $\mu$  the spectra coincide; when the compound was excited with waves of 365 m $\mu$  there is a small discrepancy, which is due to the addition of "blue" luminescence of glycerin. In this case the change in polarization rate amounts to 7% over the same interval of  $6000\text{ cm}^{-1}$ . The change in polarization rate with respect to the fluorescence spectrum for 2-acetylanthracene in glycerin at 20C and in isobutyl alcohol at 120C was 8 and 13%, respectively, over the same interval. The results obtained are taken to prove the previous assertion. Orig. art. has: 3 figures.

ASSOCIATION: none

SUBMITTED: 28Jun62

DATE ACQ: 15Jul63

ENCL: 00

SUB CODE: 00

NO REF SOV: 005

OTHER: 003

  
Card 2/2

S/048/63/027/001/017/043  
B163/B180

AUTHORS: Sevchenko, A. N., Ol'dekop, Yu. A., Zyat'kov, I. P., and  
Bylina, G. S.

TITLE: Use of vibrational spectra for the investigation of the  
reaction mechanism of auto-oxidation

PERIODICAL: Akademiya nauk SSSR. Izvestiya. Seriya fizicheskaya,  
v. 27, no. 1, 1963, 41-44

TEXT: In a spectrophotometer MKC-14 (IKS-14), the infrared absorption  
spectrum of a reaction mixture of benzaldehyde and  $\text{CCl}_4$  was recorded  
during consecutive stages of the reaction in the range  $700\text{-}2000\text{ cm}^{-1}$ .  
After the end of the auto-oxidation, the absorption bands of a residue of  
non-oxidized benzaldehyde and of perbenzoic and benzoic acid were found,  
but no evidence for the presence of any other intermediate products.  
During the reaction, however, bands with maxima appear at  $852\text{ cm}^{-1}$  and  
 $1255\text{ cm}^{-1}$  which belong to neither perbenzoic nor benzoic acid. It is  
assumed that these new bands belong to some unstable intermediate product

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• Use of vibrational spectra for the ...

S/048/63/027/001/017/043  
B163/B180

preceding the perbenzoic acid. This paper was presented at the 14th Conference on Spectroscopy in Gor'kiy, July 5-12, 1961. There are 3 figures.

ASSOCIATION: Belorusskiy gos. universitet im. V. I. Lenina (Belorussian State University imeni V. I. Lenin) ✓

Card 2/2

SEVCHENKO, A. N.; OL'DEKOP, Yu. A.; ZYAT'KOV, I. P.; BYLINA, G. S.

Use of vibration spectra in studying the mechanism underlying  
self-oxidation reactions. Izv. AN SSSR. Ser. fiz. 27 no.1:  
41-44 Ja '63. (MIRA 16:1)

1. Belorusskiy gosudarstvennyy universitet im. V. I. Lenina.

(Molecular spectra) (Oxidation)

L 10157-63

EW(1)/BDS--AFFTC/ASD/ESD-3/ESD

ACCESSION NR: AP3000319

8/0048/63/027/005/0651/0655

A.N.  
AUTHOR: Volod'ko, L. V.; Sevchenko, L. V.; Umreyko, D. S.

58  
57  
TITLE: Temperature dependence and nature of the electronic absorption spectra of uranyl compounds [Report: Eleventh Conference on Luminescence held at Minsk 10-15 Sept. 1962]

SOURCE: Izvestiya AN SSSR, Seriya fizicheskaya, v. 27, no. 5, 1963, 651-655

TOPIC TAGS: absorption, fluorescence, uranyl compounds

ABSTRACT: A distinctive trait of the absorption and luminescence spectra of uranyl compounds is their strong temperature dependence, which reflects changes in the interaction of the uranyl ion with the surrounding medium. Whereas the origin of the fluorescence spectra of uranyl compounds is fairly well known, this is not true of the absorption spectra. Investigation of the temperature dependence of the fluorescence and absorption spectra can help elucidate the nature of the electronic absorption spectra. The authors recorded the fluorescence and absorption of acid and organic solutions of a number of uranyl

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L 10157-63  
ACCESSION NR: AP3000319

salts in the range from +20 to -183°C. The spectra of uranyl sulfate and potassium uranyl sulfate in sulfuric acid and uranyl phosphate in orthophosphoric acid are presented. Experimental and calculated mirror symmetry of the fluorescence and absorption spectra is compared. It is concluded that absorption involves several different electronic transitions. Orig. art. has: 2 figures.

ASSOCIATION: Belorusskiy gos. universitet im. V. I. Lenina (Belorussian State University)

SUBMITTED: 00

DATE ACQ: 12Jun63

ENCL: 00

SUB CODE: PH

NR REF SOV: 003

OTHER: 000

*gk/923*  
Card 2/2



L 9858-63  
RM/JD/MAY/IJP(C)

EWP(j)/EWT(1)/EWP(q)/EWT(m)/BDS--AFFTC/ASD/ESD-3/SSD--Pc-4--

ACCESSION NR: AP3001344

S/0048/63/027/006/0710/0716

70

AUTHOR: Sevchenko, A. N.; Kuznetsova, V. V.; Khomenko, V. S.

TITLE: Luminescence<sup>2</sup> of solutions and salts of organic-rare earth complexes<sup>1</sup>  
[Report of the Eleventh Conference on Luminescence held in Minsk from 10 to 15 September 1962]

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v. 27, no. 6, 1963, 710-716

TOPIC TAGS: luminescence, rare earth-organic complexes, analysis of rare earths

ABSTRACT: Investigation of the luminescence of rare earth compounds is of interest in view of the distinctive nature of the spectroluminescent properties of this class of compounds and the light such studies throw on different theoretical and practical problems. For the present study there were synthesized compounds of 14 rare earth elements with various organic addends: dibenzoylmethane, benzoylacetone, acetylacetone, derivatives of salicylaldehyde and salicylic acid, derivatives of 8-hydroxyquinoline, alpha-substituted pyridines, etc. Most of the complexes had the metal:addend proportions 1:3. The absorption

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L 9858-63

ACCESSION NR: AF3001344

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spectra of complexes with dibenzoylmethane in ethyl alcohol are given. The shift of the main absorption band and decrease of the absorption coefficient are criteria for the existence of stable complexes in solution. The luminescence of Eu, Sm, Tb, Dy and Yb complexes in solution and in the crystalline state is excited in the near UV, that is, in the continuous absorption region of the organic part of the molecules. The complexes formed by the other rare earths exhibit no or only weak luminescence. The excitation mechanism is discussed. Level and transition diagrams for rare earth complexes with some organic molecules are proposed and energy transfer (migration) is discussed. Use of organic complexes and observation of luminescence provides a simple and reliable method for determination of the luminescing rare earth elements. The spectroluminescent rare earth-organic complex procedure should be particularly useful for determination of the total rare earth content and for checking the purity of some substances. Orig. art. has: 4 figures.

ASSOCIATION: none

SUBMITTED: 00

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: PH,CH

NR REF SOV: 014

OTHER: 009 FR AID: 29Aug63

Card 2/2 ja/nh

L 9857-63

EWT(1)/EWT(m)/BDS--AFPTC/ASD/ESD-3/AFWL--RM/MAY/IJP(C)

S/0048/63/027/006/0720/0723

ACCESSION NR: AP3001346

AUTHOR: Gurinovich, G. P.; Kruglik, Ye. K.; Sevchenko, A. N.

TITLE: Concerning the shape of luminescence spectra under anti-Stokes excitation  
[Report of the Eleventh Conference on Luminescence held in Minsk from 10 to 15 September 1962]

SOURCE: AN SSSR. Izv. Seriya fizicheskaya, v. 27, no. 6, 1963, 720-723

TOPIC TAGS: Stokes and anti-Stokes excitation, luminescence of organic molecules, fluorescein, rhodamine B, tryptaflavine, eocin, esculin, phthalimides

ABSTRACT: Numerous investigations of the relation between absorption and luminescence spectra have shown that for Stokes excitation thermodynamic equilibrium is attained during the lifetime of the excited state. Yet the existence of the "Stokes cutoff" of the luminescence spectra with excitation in the anti-Stokes region implies an energy deficit that is not compensated during the excitation lifetime. There is no good theoretical explanation for the difference; moreover, most experimental data on the "Stokes cutoff" are rather

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L 9857-63

ACCESSION NR: AP3001346

2

old and in need of verification with the aid of modern techniques. The present work was devoted to investigation of the dependence of the shape of luminescence spectra on the excitation wavelength in the Stokes and anti-Stokes region. The radiation was obtained from mercury and xenon discharge tubes and the desired wavelengths isolated by means of a DMR-1 double monochromator. Care was taken to minimize scattering and to take the remaining scattered radiation into account. For the measurements there were chosen substances and solvents with maximum overlapping of the luminescence and absorption spectra. The luminescent substances studied were fluorescein, rhodamine B, tryptaflavine, eosin, esculin and a series of phthalimide derivatives. The solvents were ethyl alcohol, water, glycerol, benzene, anisole and dioxane. In the case of fluorescein it was found that although the exciting lines extend far into the region of fluorescence, there is no noticeable shortening of the short wavelength part of the fluorescence spectrum. The spectral intensity distribution in the fluorescence spectra of eosin and esculin in alcohol (and esculin in water) shows no excitation wavelength dependence. The picture for the phthalimides is more complicated and somewhat difficult to interpret. Definitive conclusions must await further studies. Orig. art. has: 3 figures.

ASSOCIATION: none

Card 2/3

L 9857-63

ACCESSION NR: AP3001346

SUBMITTED: 00

DATE ACQ: 01Jul63

ENCL: 00

SUB CODE: PH

NR REF SOV: 008

OTHER: 004 FR AID: 29Aug63

*ja/nh*

Card 3/3

S/053/63/079/002/001/004  
B102/B186

AUTHORS: Gurinovich, G. P., Sevchenko, A. N., Solov'yev, K. N.

TITLE: Spectroscopy of porphyrins

PERIODICAL: Uspekhi fizicheskikh nauk, v. 79, no. 2, 1963, 173 - 234

TEXT: The present review article covers the published literature from 1933 to 1961. The chapters are as follows: (1) Introduction; (2) Chemical structure of the porphyrin molecules; (3) IR spectra of the porphyrins and problems of the molecule structure; (4) The electron spectra (absorption spectra, mirror symmetry of absorption and emission spectra, external effects on the spectra, effect of the pH of the solution, effect of the metal in the case of metal porphyrins, transitions with the participation of metastable states); (5) Quantum yield and luminescence period; (6) Polarized fluorescence of porphyrin derivatives (maximum polarization and the symmetry in the molecule structure, polarization spectra and the oscillator model of the porphyrin molecule); (7) Interpretation of the electron spectra (theory, experiments, interpretation of the vibrational spectra); (8) Spectroscopy of the associated forms of the porphyrin molecules; (9) Paramagnetic resonance. There are 27 figures and Card 1/2

Spectroscopy of porphyrins

193 references.

S/053/63/079/002/001/004  
B102/B186

Card 2/2

SEVCHENKO, A.N. [Seuchanka, A.N.]; UMREYKO, D.S. [Umreika, D.S.]

Mirror symmetry and the nature of electron absorption spectra of  
uranyl compounds. Vestsi AN BSSR. Ser. fiz.-tekh. nav. no.3:  
37-44 '63. (MIRA 16:10)



OL'DEKOP, Yu.A.; SEVCHENKO, A.N.; ZYAT'KOV, I.P.; YEL'NITSKIY, A.P.

Acyl peroxides. Part 2: Synthesis and properties of aliphatic  
nonsymmetrical diacyl peroxides with unbranched chains. Zhur.  
ob. khim. 33 no.8:2771-2774 Ag '63. (MIRA 16:11)

1. Belorusskiy gosudarstvennyy universitet imeni V.I. Lenina.

GURINOVICH, G.P.; SHUL'GA, A.M.; SEVCHENKO, A.N., akademik

Polarized luminescence of the reduced forms of porphyrins.  
Dokl. AN SSSR 153 no.3:703-705 N '63. (MIRA 17:1)

1. AN SSSR (for Sevchenko).

SEVCHENKO, A.N., akademik; KONEV, S.V.; KATIBNIKOV, M.A.

Oscillatory nature of the long-wave absorption band of  
tryptophan. Dokl. AN SSSR 153 no.4:875-877 D '63.

(MIRA 17:1)

1. Belorusskiy gosudarstvennyy universitet im. V.I. Lenina.
2. AN BSSR (for Sevchenko).

SEVCHENKO, A.N.; akademik; SOLOV'YEV, K.N.; SHKILMAN, S.F.;  
SARZHEVSKAYA, M.V.

Quasi-line electron vibration spectra of porphine and  
dihydroporphine. Dokl. AN SSSR 153 no.6:1391-1394 D '63.  
(MIRA 17:1)

1. Institut fiziki AN BSSR. 2. AN BSSR (for Sevchenko).

L 65272-65

ACCESSION NR: AR5014402

UR/00511/65/000/004/D054/D054

10  
B

SOURCE: Ref. zh. Fizika, Abs. 4D410

AUTHOR: Volod'ko, L. V.; Sevchenko, A. N.; Umreyko, D. S.

TITLE: The effect of medium and temperature on the probability of transitions in the electron spectra of uranyl compounds

CITED SOURCE: Tr. Komis. po spektroskopii AN SSSR, vyp. 1, 1964, 672-678

TOPIC TAGS: uranium compound, electron spectrum, electron transition

TRANSLATION: The authors investigate the cause of temperature quenching in solutions of uranyl salts. A relationship is found between the probability of emission and overlap of electron transitions in the absorption spectra. The value of the overlap is determined by the nature and structure of the immediate environment of the uranyl ion.

SUB CODE: NP

ENCL: 00

Card

1/1

ACCESSION NR: AP4033646

S/0250/64/008/003/0147/0149

AUTHORS: Sevchenko, A. N.; Tkachev, V. D.

TITLE: Kinetics of photoconductivity in n-type silicon single crystals irradiated by high speed electrons

SOURCE: AN BSSR. Doklady\*, v. 8, no. 3, 1964, 147-149

TOPIC TAGS: impurity photoconductivity, silicon single crystal, electron beam, conduction zone, electron concentration, relaxation curve

ABSTRACT: The kinetics of impurity photoconductivity in n-type silicon single crystals, irradiated by 1 Mev electron beam, was studied. The investigated kinetics were connected with electron transitions of  $E_c = 0.16, 0.26, 0.29, \text{ and } 0.40 \text{ eV}$  centers in the conduction zone. All measurements were made at 80K. In the analysis it is assumed that thermal exchange between the investigated levels and zones is negligible. The solution of the kinetic equation is then given in the form of

$$\Delta n_n = \Delta n_{cr} \left[ 1 - \exp\left(-\frac{t}{\tau_n}\right) \right]$$

and

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ACCESSION NR: AP4033646

$$\Delta n_c = \Delta n_{cr} \exp\left(-\frac{t}{\tau_c}\right)$$

where  $\Delta n_H$  - increase in electron concentration and  $\tau_H$  - growth constant. Typical relaxation curves are given for energy level  $E_c = 0.16$  ev, obtained by irradiating the specimen to increase the Fermi level slightly higher than the given center energy level  $E_c$ . From these measurements electron capture cross sections were determined for each level to an accuracy of 70%. Orig. art. has: 7 formulas and 2 figures.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina (Belorussian State University)

SUBMITTED: 26Dec63

ENCL: 00

SUB CODE: SS

NO REF SCV: 004

OTHER: 000

Card 2/2

ACCESSION NR: AP4039327

S/0250/64/008/004/0223/0225

AUTHORS: Tkachev, V. D.; Sevchenko, A. N.; Lugakov, P. F.

TITLE: Capture of minority current carrier in n-type silicon irradiated by fast electrons

SOURCE: AN BSSR. Doklady\*, v. 8, no. 4, 1964, 223-225

TOPIC TAGS: minority current carrier, silicon single crystal, hole type, photoconductivity, hole capture, adhesion center, infrared radiation

ABSTRACT: The process of minority current carrier adhesion in n-type silicon single crystals has been studied under high speed electron beam radiation (1 Mev). The monocrystal was obtained by the method of vertical melt zone in vacuum, containing not more than  $5 \times 10^6$  oxygen atoms per  $1 \text{ cm}^3$  as well as by growing it in a quartz tube containing  $10^{18}$  oxygen atoms per cc. Nonequilibrium carriers were injected by means of light pulses. In the case of the quartz grown single crystal, hole capture was noticed clearly at low temperatures (80K) under electron bombardment. The photoconductivity of this crystal is represented graphically as a function of radiation time with an integrated electron current of  $1.2 \times 10^{17}$  electrons/ $\text{cm}^2$  (see Fig. 1 on the Enclosure). The figure shows that after switching

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ACCESSION NR: AP4039327

on the light the conductivity increases sharply because of the generation of nonequilibrium carriers with time durations of the order of hole lifetimes in the monocrystal. The nonlinear rise  $\Delta \sigma_2$  may be explained by photo-hole capture centers filled with electrons after switching on the light. The energy locations of adhesion centers are determined from the photoconductivity changes connected with infrared radiation absorption. "The authors are deeply grateful to V. S. Vavilov and A. F. Plotnikov for their many valuable remarks, and to A. G. Litvinko and M. T. Lappo for their help." Orig. art. has: 2 figures.

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina (Belorussian State University)

SUBMITTED: 25Dec63

DATE ACQ: 09Jun64

ENCL: 01

SUB CODE: SS

NO REF SOV: 001

OTHER: 003

Card 2/3

L 13777-65 ASD(m)-3/SSD/BSO/AS(mp)-2/AFWL/ESD(gs)/ESD(t)

ACCESSION NR: AP4044847

S/0051/64/017/003/0356/0363

AUTHOR: Volod'ko, L. V.; Sevchenko, A. N.; Jmreyko, D. S. 6

TITLE: Temperature dependence of electron spectra of inorganic solutions of uranyl salts

SOURCE: Optika i spektroskopiya, v. 17, no. 3, 1964, 356-363

TOPIC TAGS: electron spectrum, temperature dependence, fluorescence, uranyl radical, excitation spectrum, luminescence spectrum

ABSTRACT: Investigations of electron spectra at low temperatures are important both from the point of view of determining the nature of the spectra themselves and from the point of view of explaining the mechanism of fluorescence of uranyl compounds and the concomitant redistribution of the excitation energy over the various channels. The uranyl salts were dissolved in inorganic acids having like anions, and the absorption spectra were recorded with an SF-10 glass automatic recording double-beam spectrophotometer in which the original cuvette was replaced by a thermostatic chamber holding cuvettes filled with the investigated solution and solvent. The test apparatus

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L 13777-65

ACCESSION NR: AP4044847

and procedure are described. The decrease in temperature was shown to be accompanied by a narrowing of the fluorescence band and by a monotonic shift towards the short-wave region. The form of the spectral bands also changed with variation of the temperature. On the other hand, the energy distribution over the fluorescence spectrum of acid solutions of the investigated uranyl salts is practically independent of the temperature. An analysis and the resolution of the different bands indicate that the absorption spectrum of the uranyl compounds has a complicated nature in the visible region and consists of several spectra, each corresponding to a group of optical transitions into its own electronic excited state. The transition between the first excited state and the ground state form a luminescence spectrum and a long-wave absorption spectrum which have mirror symmetry properties. The afterglow and the quantum yield of fluorescence of the investigated inorganic solutions increase with decreasing temperature. Orig. art. has: 3 figures and 1 table.

ASSOCIATION: None

Card 2/3

ACCESSION NR. AP4034036

S/0020/64/155/006/1345/1347

AUTHOR: Gurinovich, I. F.; Gurinovich, G. P.; Savchenko, A. N.  
(Academician)

TITLE: The problem of the structure of the products, of the photo-chemical reactions of porphyrins

SOURCE: AN SSSR. Doklady\*, v. 155, no. 6, 1964, 1345-1347

TOPIC TAGS: porphyrins, porphine, tetraazaporphine, porphyrazine, photochemical reaction, photoreduction, porphine photoreduction, photoreduced porphine structure, visible spectrum, IR spectrum, porphine infrared spectrum

ABSTRACT: The study was intended as a step in the continuous effort to clarify the structure of the photoreduction products of porphines and, more particularly, to determine the location of the two hydrogen atoms which are added as a result of the reduction. The experiments were carried out with tetraazaporphine (porphyrazine) in order to find out whether the aza atoms, which correspond to the methine bridges of the porphine molecule, are hydrogenated. If they are, an

Card 1/3

ACCESSION NR. AP4034036

intense NH-band would be expected to appear in the IR spectrum. The photoreduction of tetraazaporphine was completed in pyridine under vacuum, using  $H_2S$ , and in the presence of powdered KBr. Upon completion of the photoreduction, the solvent was vaporized in vacuum and the reduced product was ready for IR investigation in the pressed KBr tablet: this method prevented oxidation and contamination of the sample. The visible spectrum of the reduced product contained a strong new absorption maximum of 450  $\mu m$ . The maxima, characteristic for the initial product, were largely reduced. The action of air restored the initial spectrum. The changes in the IR spectrum gave reason to believe that no NH-groups were formed. Moreover, the initial NH-bands of the groups located in the center of the molecule disappeared because of the assumed shift in the conjugation system. The results indicate that, at least in the case of tetraazaporphine, hydrogenation does not take place at the bridge atoms. The most likely location of the hydrogenation is assumed to be in the pyrrole rings. Orig. art. has: 2 figures.

Card 2/3

ACCESSION NR. AP4034036

ASSOCIATION: Institut fizikii Adademii nauk BSSR (Institute of  
Physics, Academy of Sciences BSSR)

SUBMITTED: 25Jan64

DATE ACQ: 20May64

ENCL: 00

SUB CODE: CH

NO REF SOV: 008

OTHER: 002

Card 3/3

ACCESSION NR. AP4035816

S/0020/64/156/001/0125/0127

AUTHOR: Gurinovich, G. P.; Patsko, A. I.; Shul'ga, A. M.; Savchenko, A. N. (Academician)

TITLE: Regeneration mechanism of photoreduced porphyrins

SOURCE: AN SSSR. Doklady\*, v. 156, no. 1, 1964, 125-127

TOPIC TAGS: photochemistry, photoreduction, porphyrins, chlorophyll, protoporphyrin, mesoporphyrin, tetraphenylporphine, tetraazaporphine, porphyrazine, triplet state

ABSTRACT: This study explains the mechanism of the regeneration of photoreduced porphyrins. Experiments were conducted with protoporphyrin, mesoporphyrin, tetraphenylporphine, and tetraazaporphine (porphyrazine) in 7:1 alcohol-pyridine solution; porphyrin concentrations were in the range of  $2-3 \cdot 10^{-2}$  mol/l; light was provided by a 500-watt motion-picture bulb. The kinetics of photoreduction and photoregeneration were traced by the change in the intensity of characteristic absorption bands. White light and light filtered

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ACCESSION NR. AP4035816

through KS-18 (red) or SS-8 (blue) filters in correspondence with the two main absorption peaks (745 m and 445 m for mesoporphyrin) were used. The results may indicate that the reactions studied take place on the triplet levels of both the initial and the photoreduced porphyrin. The triplet-triplet absorption spectra of the substance studied were actually obtained. Orig. art. has: 2 figures.

ASSOCIATION: Institut fiziki, Akademii nauk BSSR (Institute of Physics, Academy of Sciences BSSR)

SUBMITTED: 02Jan64

DATE ACQ: 26May64

ENCL: 00

SUB CODE: CH

NO REF SOV: 007

OTHER: 002

Card 2/2



L 40674-65 ENT(1)/ENT(m)/ENP(j)/T Pc-L/Pi-L IJP(c) RM 32

ACCESSION NR: AP5010044

UR/0368/65/002/002/0147/0153

AUTHOR: Kuznetsova, V. V.; Sevchenko, A. N.; Khomenko, V. S.

TITLE: Physicochemical and luminescence properties of europium and terbium organic complexes

SOURCE: Zhurnal prikladnoy spektroskopii, v. 2, no. 2, 1965, 147-153

TOPIC TAGS: rare earth chelate, europium chelate, terbium chelate, luminescence property, laser application

ABSTRACT: Luminescence characteristics of europium and terbium chelate compounds with benzoylacetone (BA), thenoyltrifluoroacetone (TTA), dipropionylmethane (DPM), tribenzoylmethane (TBM), and ethylenediaminesalicylaldehyde (EDSA) have been studied because of the widespread use of rare earth elements in quantum electronics. Methods of preparing new chelate compounds were described. The composition of the complexes was determined by chemical analysis and by comparing the coefficients of molar extinction of a complex and free ligand. Both methods gave an identical 1:3 ratio of the metal oxide to the ligand in all complexes studied except that with EDSA, which gave a

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L 40674-65

ACCESSION NR: AP5010044

1:2 ratio. High quantum yields of luminescence of the most intense spectral lines were found in all Eu and Tb chelates studied in crystalline or dissolved state at low temperature. The most interesting properties for laser application were displayed by Eu and Tb chelates in solutions. A series of empiric solutions were prepared by mixing solvents or adding small amounts of activators (pyridine, piperidine, dimethylformamide, etc.) to enhance the quantum yield by excluding the possibility of partial dissociation of a complex or distortion of the high symmetry of the intramolecular field. Luminescence spectra, quantum yields of the most intense lines, and luminescence lifetimes were given for certain Eu and Tb chelates in solution. In general, the spectral distribution of the emitted energy is more uniform in Tb complexes than in Eu complexes. Therefore, the quantum yields of separate lines are significantly lower for Tb complexes, with few exceptions. The highest quantum yield was found in an Eu (BA + DBM) complex in petroleum ether for a 6123 Å line. The lifetimes  $\tau$  of the excited state were found constant within a larger temperature range in Eu than in Tb chelate compounds. This was due

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L 40674-65

ACCESSION NR: AP5010044

to a difference in the luminescence quenching pattern of the excited rare-earth ion. Temperature dependence of the quantum yield and of reflected deactivation energy changes in the organic component of the molecule and in the rare-earth ion, respectively, and therefore do not follow the same pattern. Most of the Eu complexes are still luminescent at room temperature, while Tb complexes are luminescent mainly at low temperature. Very great variations in properties between individual compounds of the Eu and Tb chelate group must be taken into account for their evaluation as potential laser materials, which was discussed in previous articles in nos. 3 and 4, 1964, of the same periodical. Orig. art. has: 5 figures and 4 tables. [JK]

ASSOCIATION: none

SUBMITTED: 17Jul64

ENCL: 00

SUB CODE: OC, OP

NO REF SOV: 010

OTHER: 007

ATD PRESS: 3231

Card 3/3 *pm*

L 33239-65 EPA(s)-2/EWT(m)/EPF(c)/EWP(j)/T Pc-4/Pt-4/Pt-10 RM

ACCESSION NR: AP5007564

S/0020/65/160/005/1083/1086

AUTHOR: Matusevich, P. A.; Osipenko, F. G.; Sevchenko, A. N. (Academician, AN BSSR)

TITLE: Investigation of certain physical properties of condensation products of o-dihydroxybenzene and formaldehyde.

SOURCE: AN SSSR. Doklady, v. 160, no. 5, 1965, 1083-1086

TOPIC TAGS: organic semiconductor, semiconducting polymer, pyrocatechol formaldehyde resin, electrical property, magnetic property

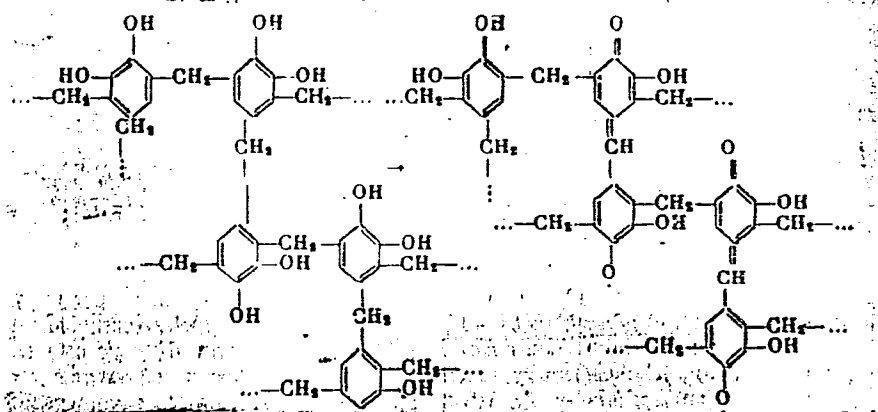
ABSTRACT: A study has been made of the magnetic and electrical properties of pyrocatechol-formaldehyde resins and of the effect of heat treatment on these properties. The resins were prepared under various conditions by condensation to the resin stage, forming insoluble, infusible, slow-burning, dark-brown to black resins. This work was done to study the effect of a methylene bridge, between benzene rings in the backbone, on the properties of the conjugated polymers. EPR spectroscopy (at 20-450C under nitrogen) and IR spectroscopy confirmed that the polymers were in fact conjugated systems. Control experiments showed that the polymers were paramagnetic in the ground state. The unpaired spin concentration of the non-heat-treated polymer increased with the degree of cross-linking, and on heat treatment it increased to a maximum of  $10^{20}$  at 350C. Electrical measurements (direct current) using block specimens

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L 33239-65

ACCESSION NP: AP5007564

showed that the temperature dependence of conductivity obeyed an exponential law; the conductivity was  $2.6 \times 10^{-7}$  and  $8.5 \times 10^{-4} \text{ ohm}^{-1} \text{ cm}^{-1}$  at 20 and 700C, respectively. Heat treatment caused a conductivity rise, starting at 200C, when cross-linking began; at above 700C after cross-linking was complete, conductivity remained constant. This effect of heat treatment was attributed to the formation of a three-dimensional conjugated system and to partial oxidation to form semiquinones:



Card 2/3

L 33239-65

ACCESSION NR: AP5007564

Orig. art. has: 1 table, 4 figures, and 1 formula.

[SM]

ASSOCIATION: Belorusskiy gosudarstvennyy universitet im. V. I. Lenina (Belorussian State University)

SUBMITTED: 12Aug64

ENCL: 00

SUB CODE: GC, OC

NO REF SOV: 019

OTHER: 002

ATD PRESS: 3207

Card 3/3

L 64310-65 EPT(c)/ENP(j)/EWA(c)/ETP(l)/ETP(m) IJP(c) RM

ACCESSION NR: AP5012763

UR/0020/65/161/006/1313/1316

AUTHOR: Sevchenko, A. N.<sup>44/55</sup> (Academician AN BSSR); Solov'yev, K. N.<sup>44/55</sup>; Shkirman, S. F.<sup>44/55</sup>  
Kachura, T. F.<sup>44/55</sup>

TITLE: Quasi-linear electronic spectra of tetrabenzoporphin 9

SOURCE: AN SSSR. Doklady, v. 161, no. 6, 1965, 1313-1316

TOPIC TAGS: absorption spectrum, fluorescence spectrum, spectrum analysis, non-metallic organic compound, electron transition

ABSTRACT: The authors investigate the quasi-linear absorption and fluorescence spectra of tetrabenzoporphin, from which a whole series of benzoporphins is derived. The tetrabenzoporphin was dissolved in chlorobenzene and small quantities of it were introduced into a hydrocarbon. The quasi-line spectra were photographed with a glass spectrograph ISP-51 with long-focus UR-84 camera. The spectrum was analyzed in detail and both differences and similarities of the room-temperature absorption spectra of tetrabenzoporphin and the porphyrins are discussed in detail. A table is presented of the frequencies of the normal oscillations of tetrabenzoporphin, based on the study of the quasi-line fluorescence and absorption spectra corresponding to four electronic transitions. The results are compared with those obtained by others. The causes of the peaks in the absorption band are explained. Some

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L 64310-65

ACCESSION NR: AP5012763

3  
hypotheses concerning the nature of the multiplets in the spectra are advanced and it is suggested that in the present case the structure of the multiplet is determined only by the orientation of the electronic oscillator relative to the molecular axis. Orig. art. has: 2 figures and 1 table.

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Institute of Physics, Academy of Sciences, BSSR) 4.55

SUBMITTED: 03Dec64

ENCL: 00

SUB CODE: OP

NR REF SOV: 004

OTHER: 002

KC  
Card 2/2



L 4198-66 EWT(1)/EWT(m)/EWP(j) IJP(c) RM

ACCESSION NR: AP5013440

UR/0020/65/162/001/0057/0059

AUTHOR: Sevchenko, A. N. (Academician AN BSSR); Pikulik, L. G.; Kostko, M. Ya.

TITLE: Duration of fluorescence in complex molecules

SOURCE: AN SSSR. Doklady, v. 162, no. 1, 1965, 57-59

TOPIC TAGS: fluorescence spectrum, luminescence, quantum yield

ABSTRACT: The authors study the persistence of fluorescence in solutions as a spectral function of the frequency of the activating light including the anti-Stokes excitation region. Phthalimide derivatives and other organic compounds were used as study specimens. Water, alcohols and dioxane were used as solvents. A fluorometer was used with a measurement range of  $2 \cdot 10^{-10}$  to  $10^{-7}$  sec. The other equipment and the methods used in the experiment are described briefly. Special precautions were taken to reduce stray light which might fall onto the photomultiplier. The measurements were made at various concentrations depending on the intensity of the illumination. Since concentration quenching of fluorescence does not take place in phthalimides, a concentration close to saturation could be used where necessary.

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L 4198-66

ACCESSION NR: AP5013440

It is found that the duration of luminescence is constant throughout the entire Stokes region of the excitation spectrum. Since the duration of the excited state is proportional to quantum yield for phthalimides and dyes under ordinary conditions, these data confirm Vavilov's law on a constant quantum yield in the Stokes excitation region. A constant fluorescence duration was also observed in the anti-Stokes excitation region which indicates that quantum yield is also constant in this region. A reduction in fluorescence duration was observed in the longer-wave anti-Stokes excitation region which should be studied further in view of the sharp reduction in absorption in this region and the consequent attenuation of luminescence which affects the reliability of measurements. In conclusion, the authors are deeply grateful to V. I. Shirokov for making the control measurements and for assistance in adjusting the fluorometer, and also to V. V. Zelinskiy for furnishing the phthalimides. Orig. art. has: 2 figures, 1 table. 44, 55.

ASSOCIATION: Institut fiziki Akademii nauk BSSR (Institute of Physics, Academy of Sciences, BSSR)

SUBMITTED: 23Dec64 44, 55

ENCL: OC

SUB CODE: OP, GC

NO REF SOV: 007

OTHER: 000

Card 2/2 DP

SEACHENAG, A.M.; KREYER, D.S.

Interpretation of the absorption spectra of certain organic uranyl  
complexes. Izv. AN SSSR. Ser. fiz. 49 no.8:1349-1352 '65.

(MIRA 18:8)

L. Belorusskiy gosudarstvennyy universitet im. V.I.Lenina.

SEVCHENKO, A.N., Akademi; SOLOV'YEV, K.N.; MASHENOV, V.A.; SHKIRMAN, S.F.

Low-temperature polarization spectra of porphine and its derivatives.  
Dokl. AN SSSR 243 no.6:1367-1370 Ag '65.

(MIRA 18:8)

1. Institut fiziki AN BSSR. 2. AN BSSR (for Sevchenko).

L01256-66 EWT(1)/EWT(m)/EPF(c)/EWP(j)/AVA(c) IJP(c) RM

ACCESSION NR: AP5020802

UR/0048/65/029/008/1374/1377

AUTHOR: <sup>44.55</sup> Strelkova, T. I.; <sup>44.55</sup> Sevchenko, A. N.

TITLE: Comparative study of the effect of pH on the <sup>21.44.5</sup> ~~spectro-luminescent properties~~ of porphyrins and chlorines <sup>48</sup> ~~Report, 13th Conference on Luminescence held in Khar'kov 25 June to 1 July 1964~~ <sup>44.55</sup>

SOURCE: AN SSSR. Izvestiya. Seriya fizicheskaya, v. 29, no. 8, 1965, 1374-1377

TOPIC TAGS: absorption spectrum, solution property, solution acidity, chlorophyll,

ABSTRACT: The authors have investigated the effect of hydrogen ion concentration on the absorption and luminescence spectra of porphyrins and chlorines. These materials were selected for investigation in part because of their importance in photosynthesis. Absorption spectra are presented graphically for porphyrin and pheophytin-a in acidized ethyl alcohol. In alkaline solutions porphyrin showed the four-band absorption spectrum of the neutral molecule; the two-band spectrum of the doubly charged porphyrin ion appeared in acid solutions. There was an isobestic point which, however, did not persist in the most acid solutions. The refractive index of the solvent varied considerably with pH. It is concluded

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L01256-66

ACCESSION NR: AP5020802

that reducing the pH leads to formation of the doubly charged porphrin ion, and that the life-time of the singly charged ion is too short to allow its detection in the absorption spectrum. Similar results were obtained with other porphyrins: octaethylporphrin, dimethyl ether mesoporphyrin IX, dimethyl ether protoporphyrin, IX, and tetraphenylporphyrin. In the pheophytin solutions it was possible to detect both singly and doubly charged cations and to determine the negative logarithm of the equilibrium constant ( $pK$ ) for them; for the doubly charged ion  $pK \approx 0.76$ , and for the singly charged ion  $pK \approx 1.75$ . With decreasing pH the long wavelength absorption band first shifted toward the shorter wavelengths and with further decrease of the pH it began to shift back. The two absorption bands in the green disappeared at low pH and the absorption spectrum became very similar to that of chlorophyll. In dioxane, both chlorine and pheophytin had two isobestic points in all values of the pH. Orig. art. has: 2 figures.

ASSOCIATION: none

SUBMITTED: 00

ENCL: 00

SUB CODE: OP, GC

NO REF SOV: 006

OTHER: 014

Card

*mi*  
2/2

GURINOVICH, I.F.; GURINOVICH, G.P.; SEVCHENKO, A.N., akademik; TAUGER, S.M.

Structure of products of the photooxidation reaction of  
porphyrins. Dokl. AN SSSR 164 no.1:201-204 S '65. (MIRA 18:9)

1. Institut fiziki AN BSSR. 2. AN BSSR (for Sevchenko).

L 9876-66 EWT(1)/EWT(m)/T IJP(c) RM  
ACC NR: AF5027349 SOURCE CODE: UR/0250/65/009/010/0647/0650

AUTHOR: Gladchenko, L. F.; Kostko, M. Ya.; Fikulik, L. G.; Sevchenko, A. N.

ORG: IFANB

ORG: Institute of Physics AN BSSR (Institut fiziki AN BSSR)

TITLE: Duration of the excited state of ultraviolet fluorescence of aromatic acids

SOURCE: AN BSSR. Doklady, v. 9, no. 10, 1965, 640-650

TOPIC TAGS: aromatization, amino acid, fluorescence

ABSTRACT: Direct measurements of the duration of fluorescence of indole, tryptophan, glycyltryptophan, tyrosine, and phenylalanine were carried out by using a phase fluorimeter of the Institute of Physics AN BSSR. The optical part of the apparatus was adapted for measurements of  $\tau$  in the ultraviolet range of the spectrum. Distilled H<sub>2</sub>O and high purity EtOH were used as solvents. Known formulas were used for calculation of the actual duration of fluorescence ( $\tau_{act}$ ).

1/2



L 9876-66

ACC NR: AF5027349

Control measurements of previously known  $\tau$  were in good agreement (accuracy ~ 10%) with the values given in the literature. The optical characteristics determined for the amino acids tested are given. Orig.art. has: 1 table.

SUB CODE: 07/ SUBM DATE: 22May65/

NR REF SOV: 002/ OTHER: 006

BC

2/2

SEVCHENKO, A.N.; TKACHEV, V.D.; IUGAKOV, P.F.

Bipolar mechanism underlying the excitation of impurity photoconductivity. Dokl. AN BSSR 9 no.12:801-803 D '65.

(MIRA 19:1)

1. Belorusskiy gosudarstvennyy universitet imeni Lenina.

L 40352-66 EWT(m)/EWT(t)/ETI IJP(c) GG/JD

ACC NR: AP6019223

SOURCE CODE: UR/0250/66/010/002/0080/0082

76  
75  
B

AUTHOR: Sevchenko, A. N.; Tkachev, V. D.

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet)

TITLE: Photoconductivity spectra of p-type silicon irradiated with fast electrons

SOURCE: AN BSSR. Doklady, v. 10, no. 2, 1966, 80-82

TOPIC TAGS: photoconductivity, silicon, impurity center, irradiation effect, irradiation damage, Fermi level

ABSTRACT: The object of the work was to study the kinetics of formation and stability of radiation damage in p-type silicon irradiated with 1 MeV electrons at 25-30°C and integral doses of  $10^{13}$ - $10^{18}$  electrons/cm<sup>2</sup>. The change in the shape of the spectra of impurity photoconductivity was studied as a function of the irradiation dose. The effectiveness of the formation of radiation damage was found to depend on the impurity composition of the crystals. The shape of the spectrum of the photoconductivity signal depends on the position of the Fermi level in the forbidden zone. By raising or lowering the Fermi level, one can eliminate certain centers from the photoconductivity processes, which confirms the authors' earlier hypothesis that the structure of the spectra is related to volume defects, since the change in the position of the Fermi level reflects the conditions in the volume of the crystal. The observed change in the spec-

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I. 40352-66

, ACC NR: AP6019223

tra following the cessation of irradiation is attributed not only to different stabil-  
ities of the radiation defects, but also to the occurrence of redistribution of point  
radiation defects among the various impurity atoms. In conclusion, the authors express  
their sincere appreciation to V. S. Vavilov for discussing the work and his many useful  
comments. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 14Jun65/ ORIG REF: 005

*nd*  
Card 2/2

L 27360-66 EWT(m)/EWP(t)/ETI IJP(c) JD

ACC NR: AP6011529

SOURCE CODE: UR/0250/66/010/003/0148/0150

AUTHORS: Sevchenko, A. N.; Tkachev, V. D.; Lugakov, P. E.;  
Yukhnovich, A. V.

76

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet)

B

TITLE: Investigation of the influence of heat treatment on the photoelectric properties of silicon with radiation damages in its structure

SOURCE: AN BSSR. Doklady, v. 10, no. 3, 1966, 148-150

TOPIC TAGS: silicon, single crystal, crystal structure, radiation damage, photoelectric property, heat effect, photoconductivity, fine structure, crystal defect

ABSTRACT: The purpose of the investigation was to study the temperature stability of different radiation damages which are produced in single crystal silicon when irradiated with energy particles. The initial material was p-type silicon with resistivity 7 -- 10 ohm-cm, containing  $3 \text{ -- } 8 \times 10^{17} \text{ cm}^{-3}$  oxygen. The irradiation was with 1-Mev electrons from an electrostatic generator at 80K and 30C. The spectral dependence of the stationary photoconductivity was plotted with apparatus described by

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L 27360-66

ACC NR: AP6011529

A. F. Plotnikov et al. (PTE, no. 3, 183, 1962). The results show that samples whose photoconductivity spectrum displayed no structure shortly after the cessation of the irradiation, acquired a pronounced structure after prolonged storage at liquid-nitrogen temperature. This is attributed to diffusion of the vacancy pairs resulting from the electron bombardment. An increase in the temperature and longer storage following the bombardment causes the point defects due to the bombardment to become annealed. The results are interpreted and reconciled with the level scheme of the defects. A quantitative interpretation of the phenomenon is made difficult by the presence of different types of structure defects which can become transformed into each other during annealing. Orig. art. has: 2 figures.

SUB CODE: 20/ SUBM DATE: 14Jun65/ ORIG REF: 004/

Card

2/2

L 42097-66 EWT(m)/T/EWP(t)/EII IJP(c) JD

ACC NR: AP6029648

SOURCE CODE: UR/0250/66/010/008/0550/0552

AUTHOR: Sevchenko, A. N.; Tkachev, V. D.; Urenev, V. I.

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet)

TITLE: Photoconductivity spectra of germanium single crystals irradiated with gamma-quanta

SOURCE: AN BSSR. Doklady, v. 10, no. 8, 1966, 550-552

TOPIC TAGS: germanium single crystal, gamma irradiation, electron energy level, impurity level

ABSTRACT: An investigation was made of the system of energy levels which appears in n-type and p-type germanium irradiated with gamma-quanta from  $\text{Co}^{60}$  at room temperature. Particular attention was given to a study of the stable centers which introduce deep energy levels into the forbidden zone. Photoconductivity spectra were taken in a range from 1 to 5  $\mu$  for temperatures from 300 to 80K before and after irradiation with integrated fluxes of  $10^{14}$ — $5 \times 10^{17}$  kv/cm<sup>2</sup>. The specimens used were n- and p-type germanium single crystals with initial specific resistances of 48 ohm·cm and 6 ohm·cm, respectively. The concentration of residual impurities in the electrically active state for n-type

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L 42097-66

ACC NR: AP6029648

material was up to  $10^{12}$ — $10^{13}$   $\text{cm}^{-3}$ . Investigation of the electrical characteristics of specimens after irradiation showed the presence of  $E_v + 0.01$  eV,  $E_v + 0.008$  eV, and  $E_v + 0.17$  eV levels in p-type germanium and  $E_c - 0.20$  eV level in n-type germanium. Irradiation of n-type crystals with doses up to  $5 \times 10^{17}$  kv/cm<sup>2</sup> did not change the conductivity sign. At  $T = 80\text{K}$  the Fermi level in irradiated n-type specimens was located 0.16—0.22 eV from the bottom of the conductivity zone, while in p-type specimens it was found 0.20—0.26 eV from the top of the valence zone. The presence of deep centers in both irradiated and nonirradiated crystals indicates that these centers are not generated due to the irradiation but are only displayed as the result of it. The transition of electrons between the zones and these centers in irradiated crystals can lead to a significant change in the concentration of free carriers. Such a change in concentration is possible since after irradiation the equilibrated concentration of free carriers becomes very low as a result of their capture by the radiation damage, which introduces shallower energy levels. Therefore in irradiated specimens for which the ratio  $\Delta\sigma/\sigma$  is greater, it is possible to detect deep energy levels which belong to residual imperfections of the crystal lattice. Orig. art. has: 1 figure. [JA]

SUB CODE: 20/ SURM DATE: 15Apr66/ ORIG REF: 002/ OTH REF: 002  
ATD PRESS: 5064

Card 2/2 af



L 34320-00 SOURCE: UR/0250/66/010/006/0374/0376  
 ACC NR: AP6021921  
 AUTHOR: Sevchenko, A. N.; Stel'makh, V. F.; Tkachev, V. D. 73  
 ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet) B  
 TITLE: Photoelectric properties of gallium arsenide containing structure defects due to radiation 21 27 27  
 SOURCE: AN BSSR. Doklady, v. 10, no. 6, 374-376  
 TOPIC TAGS: gallium arsenide, radiation effect, photoresistance, photoconductivity, resistivity, photoelectric property, fast neutron, neutron irradiation  
 ABSTRACT: The energy spectrum of local levels in n- and p-type gallium arsenide single crystals irradiated with fast neutrons was investigated by studying the structure of photoconductivity spectra beyond the absorption edge. Spectral dependencies of photoconductivity were recorded at temperatures of 300 and 80K using samples with a resistivity up to  $10^{12}$  ohm. The specific resistivity of the irradiated samples was found to depend markedly on the density of neutron beams: at fluxes of  $10^{14}$  neutrons/cm<sup>2</sup> the resistivity increased slowly; at higher densities it increased rapidly, showing a tendency toward saturation at  $10^{17}$  neutrons/cm<sup>2</sup>. It was concluded that the irradiation of gallium arsenide produces a great number of stable combinations of point defects and residual chemical impurities. Orig. art. has: 2 figures. [2L]  
 SUB CODE: 20/ SCHEM DATE: 09Mar66/ ORIG REF: 002/ OTH REF: 002/ ATD PRESS: 623/  
 Card 1/1

.L 04642-67

ACC NR: AP6024410

tetravenzoporphin, zinc-tetrabenzoporphin, magnesium-phthalocyanide, zinc-phthalocyanide, and phthalocyanine, together with the frequencies of the resolved lines and their relative intensities, are given. The comparison of the metal-derivative spectra with the spectra of the free bases leads to the conclusion that the general character of the vibrational structure does not noticeably change upon introduction of the metal, and that most frequencies can be compared for both types of compounds, tetravenzoporphin and phthalocyanine, with the exception of the most active frequencies. The changes of the corresponding vibrations in the series free base - magnesium - zinc are analogous for both the tetrabenzoporphin and phthalocyanine, showing a similar influence of the metal atom on the dynamics of the molecule in both cases. The authors thank T. F. Kachura for preparing the investigated compounds. Orig..art. has: 2 figures and 2 tables.

SUB CODE: 20/ SUBM DATE: 24Feb66/ ORIG REF: 007/ OTH REF: 002

awm

Card 2/2

ACC NR: AP6033157

SOURCE CODE: UR/0250/66/010/009/0641/0643

AUTHOR: Sevchenko, A. N. (Academician AN BSSR); Lomako, V. M.; Tkachev, V. D.

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet)

TITLE: Temperature and optical quenching of radiative recombination of gallium arsenide

SOURCE: AN BSSR. Doklady, v. 10, no. 9, 1966, 641-643

TOPIC TAGS: gallium arsenide, luminescence quenching, radiative recombination, temperature dependence, absorption band, Raman spectrum

ABSTRACT: The purpose of the investigation was to determine the influence of temperature on the spectral distribution of the radiative recombination of electroluminescent diodes obtained from n-type GaAs by diffusion of beryllium, and the influence of constant external illumination in the intrinsic absorption band ( $\lambda < 0.83$  nm) on the intensity of the recombination band. The carrier density in the initial GaAs was  $8 \times 10^{17} - 6 \times 10^{18} \text{ cm}^{-3}$ . The optical resonators were made from the crystal by cleavage. The Raman spectra were investigated with apparatus based on the IKS-12 spectrometer. The radiation receiver was a germanium photodiode or a cooled PbS photoresistance. The constant illumination was with the aid of an incandescent lamp and a number of filters. The tests were made at temperatures 80 - 30K in a cryostat evacuated to  $10^{-4}$  mm Hg. The radiative recombination without additional illumination

Card 1/2

1. 09117-67 EWT(m)/EWP(t)/ETI IJP(c) JD  
ACC NR: AP6027951

SOURCE CODE: UR/0020/66/169/003/0562/0564

AUTHOR: Sevchenko, A. N. (Academician AN BSSR); Tkachev, V. D.; Lugakov, P. F. 4-

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet)

TITLE: Energy spectrum of radiation damage in silicon single crystals 2/ 16

SOURCE: AN SSSR. Doklady, v. 169, no. 3, 1966, 562-564

TOPIC TAGS: silicon semiconductor, semiconductor band structure, crystal lattice defect, irradiation damage, impurity level

ABSTRACT: The purpose of the investigation was to determine the energy levels that appear when the crystal is irradiated with different integral fluxes of 1-Mev electrons ( $10^{13} - 10^{18}$  el/cm<sup>2</sup>), fast reactor neutrons ( $10^{12} - 10^{19}$  neut/cm<sup>2</sup>), and  $\gamma$  quanta from Co<sup>60</sup> ( $10^{15} - 10^{19}$  qu/cm<sup>2</sup>). The initial n- and p-type crystals had a resistivity 0.03 -- 150 ohm-cm and a low concentration of impurities capable of producing deep levels in the forbidden band. The investigation consisted of measuring the temperature dependence of the conductivity and of the Hall coefficient, and the spectral distribution of the photoconductivity signal. The electrical measurements identified the principal donor and acceptor centers, while the photoelectric measurements identified the levels due to point defects and some of the chemical impurities. The results

UDC: 537.312.5

Card 1/2

ACC NR: AP6034214

SOURCE CODE: UR/0368/66/005/004/0480/0485

AUTHOR: Kuznetsova, V. V.; Sevchenko, A. N.; Khomenko, V. S.

ORG: none

TITLE: Analysis of the europium chelates composition in solutions by means of luminescence spectra

SOURCE: Zhurnal prikladnoy spektroskopii, v. 5, no. 4, 1966, 480-485

TOPIC TAGS: organoeuropium compound, chelate compound, ion concentration, stability constant, luminescence spectrum, *EUROPIUM COMPOUND*

ABSTRACT: The luminescence property of the  $\text{Eu}(\text{DBM})_3$ ,  $\text{Eu}(\text{TTA})_3$ ,  $\text{Eu}(\text{BA})_3$ ,  $\text{Eu}(\text{DBM})_4 \cdot \text{HP}$ , and  $\text{Eu}(\text{BA})_4 \cdot \text{HP}$  chelate solutions in ethanol has been studied at different stages of dissociation of the complexes to determine the composition of the complex molecule in solution, the concentration of admixture of partially dissociated molecules, and the instability constants of various chelate forms. The concentration of admixture and instability constant data are important for evaluation of the stimulated emission capability of the rare earth chelates. The admixture content is directly related to the loss in pumping energy in lasers. Dissociation of the complexes was achieved by additions of anhydrous HCl; luminescence spectra  $\text{Eu}^{3+}$  in solutions were recorded at different pH values. Three complex forms:  $\text{Eu}(\text{BA})_3$ ,  $\text{Eu}(\text{BA})_2^+$ , and  $\text{Eu}(\text{BA})^{2+}$  were detected in solutions of  $\text{Eu}(\text{BA})_3$  at Ph in the 9.2—3.0 range. A four-ligand complex

Card 1/2

UDC: 535.37

ACC NR: AP6034214

SOURCE CODE: UR/0368/66/005/004/0480/0485

AUTHOR: Kuznetsova, V. V.; Sevchenko, A. N.; Khomenko, V. S.

ORG: none

TITLE: Analysis of the europium chelates composition in solutions by means of luminescence spectra

SOURCE: Zhurnal prikladnoy spektroskopii, v. 5, no. 4, 1966, 480-485

TOPIC TAGS: organoeuropium compound, chelate compound, ion concentration, stability constant, luminescence spectrum, EUROPIUM COMPOUND

ABSTRACT: The luminescence property of the  $\text{Eu}(\text{DBM})_3$ ,  $\text{Eu}(\text{TTA})_3$ ,  $\text{Eu}(\text{BA})_3$ ,  $\text{Eu}(\text{DBM})_4 \cdot \text{HP}$ , and  $\text{Eu}(\text{BA})_4 \cdot \text{HP}$  chelate solutions in ethanol has been studied at different stages of dissociation of the complexes to determine the composition of the complex molecule in solution, the concentration of admixture of partially dissociated molecules, and the instability constants of various chelate forms. The concentration of admixture and instability constant data are important for evaluation of the stimulated emission capability of the rare earth chelates. The admixture content is directly related to the loss in pumping energy in lasers. Dissociation of the complexes was achieved by additions of anhydrous HCl; luminescence spectra  $\text{Eu}^{3+}$  in solutions were recorded at different pH values. Three complex forms:  $\text{Eu}(\text{BA})_3$ ,  $\text{Eu}(\text{BA})_2^+$ , and  $\text{Eu}(\text{BA})_2^{2+}$  were detected in solutions of  $\text{Eu}(\text{BA})_3$  at Ph in the 9.2—3.0 range. A four-ligand complex.

Card 1/2

UDC: 535.37

Card 2/2

ACC NR: AP7007511

SOURCE CODE: UR/0250/67/011/001/0013/0015

AUTHOR: Sevchenko, A. H. (Academician AN BSSR); Tkachev, V. D.  
Lugakov, P. F.

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy  
gosudarstvennyy universitet)

TITLE: Electric and photoelectric properties of p-type silicon single  
crystals irradiated with fast neutrons

SOURCE: AN BSSR. Doklady, v. 11, no. 1, 1967, 13-15

TOPIC TAGS: neutron irradiation, silicon single crystal, crystal  
property, *PHOTOELECTRIC PROPERTY, ELECTRIC PROPERTY*

ABSTRACT: An investigation was made of the electric and photoelectric  
properties of silicon p-type single crystals irradiated with fast neu-  
trons. The investigated crystals contained about  $10^{18}$  oxygen atoms per  
cubic centimeter. Initial resistivity was 1 and 30 ohm·cm for lower-  
and higher-purity crystals respectively. The specimens were irradiated  
in a reactor with various fast neutron fluxes ( $1 \times 10^{13}$ — $5 \times 10^{18}$   
neutrons/cm<sup>2</sup>). The electrical conductivity was measured before and  
after irradiation, and the photoconductivity spectra were taken at room  
and nitrogen temperatures. It is shown that the increase of integral

Card 1/2

UDC: none

L 26051-56 EWT(1)/EWT(m)/EWP(1) RM SOURCE CODE: UR/0020/66/167/006/1269/1272  
ACC NR: AP6013896

AUTHOR: Gurinovich, G. P.; Kruglik, Ye. K.; Sevchenko, A. N. (Academician AN BSSR) <sup>47</sup><sub>46</sub>

ORG: Belorussian State University im. V. I. Lenin (Belorusskiy gosudarstvennyy universitet) <sup>3</sup>

TITLE: Quantum fluorescence yield of solutions of polyatomic molecules during low-wave excitation

SOURCE: AN SSSR. Doklady, v. 167, no. 6, 1966, 1269-1272

TOPIC TAGS: quantum yield, fluorescence, spectral absorptivity, molecule, photocell / STsV-4 photocell <sup>2</sup>

ABSTRACT: This paper is a report on experimental studies to determine the reasons for the reduction in quantum radiation yield of polyatomic solutions in the anti-Stokes region. Special measures were taken to assure that the specimens were pure, as well as to eliminate association, ionization, etc., i. e. attention was given to all causes known to result in several types of absorption centers in the solution. These measures resulted in several cases of quantum fluorescence yield which were independent of the excitation wavelength. The specimens were illuminated by light from a mercury (SVDSH-500) or xenon (DKSSH-1000) tube passed through a quartz monochromator. The luminescence was recorded by an STsV-4 photocell. Curves are given showing the absorption, excitation and luminescence spectra and quantum yield for solutions of

UDC: 535.371

Card 1/2



L 26051-66

ACC NR: AP6013896

3,6-tetramethyldiamino-N-methylphthalimide in benzene, rhodamine 6g in ethanol, and eosin in ethanal. It is shown that the quantum fluorescence yield is constant for all solutions and that deviations indicate absorption centers of various types. Orig. art. has: 3 figures.

SUB CODE: 20/

SUBM DATE: 14Dec65/

ORIG REF: 011/

OTH REF: 002

Card 2/2

SEVCHENKO, N.A.

Reflection and transmittance spectra of the different  
modifications of silica in the wave length range of 7 to 24  $\mu$ .  
N.A. Sevchenko and V. A. Florina  
Doklady Akad. Nauk SSSR 1958-11(1958) English translation  
C.A. 51, 6338e. B. M. R.

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Seuchenko, N. D.

3185. THE SPECTRUM OF REFLECTION AND TRANSMISSION OF DIFFERENT MODIFICATIONS OF SILICA IN THE WAVELENGTH REGION 7-24 $\mu$ . N.A. Seuchenko and V.A. Potinskaya. Dokl. Akad. Nauk SSSR, Vol. 199, No. 6, 1115-18 (1980). In Russian.

The behaviour of  $\alpha$ -quartz, and fused quartz in the region 1-15 $\mu$  has been extensively studied, but information at longer wavelengths is restricted. For a study of silica glasses it is important to know the complete spectrum of all forms of quartz. A reflecting monochromator with alternative prisms (for 7-14 $\mu$  rock salt; for 14-24 $\mu$  60° angle KBr) was used. The following types of silica were examined: (a) in reflection,  $\alpha$ -quartz, both parallel and perpendicular to the optic axis, cristobalite, and Heraeus fused silica; (b) in transmission,  $\alpha$ -quartz,  $\alpha$ -tridymite,  $\alpha$ -cristobalite, and Heraeus fused silica. The curves are plotted in each case and a table of observed peaks is given.

W. Bardale

SEVCHENKO, N. A.

PRIKHOT'KO, N. F.

24(7)

13

PHASE I BOOK EXPLOITATION SOV/1365

L'vov. Universitet

Materialy X Vsesoyuznogo sveshchaniya po spektroskopii. t. 1: Molekulyarnaya spektroskopiya (Papers of the 10th All-Union Conference on Spectroscopy. Vol. 1: Molecular Spectroscopy) [L'vov] Izd-vo L'vovskogo univ-ta, 1957. 499 p. 4,000 copies printed. (Series: Its: Fizichnyy zbirnyk, vyp. 3/8/)

Additional Sponsoring Agency: Akademiya nauk SSSR. Komissiya po spektroskopii. Ed.: Jazer, S.L.; Tech. Ed.: Saranyuk, T.V.; Editorial Board: Lavsterg, G.S., Academician (Resp. Ed., Deceased), Neporunt, B.S., Doctor of Physical and Mathematical Sciences, Pabelinskiy, I.L., Doctor of Physical and Mathematical Sciences, Fabrikant, V.A., Doctor of Physical and Mathematical Sciences, Kornitskiy, V.G., Candidate of Technical Sciences, Rayskiy, S.M., Candidate of Physical and Mathematical Sciences, Klimovskiy, L.K., Candidate of Physical and Mathematical Sciences, Miliyanchuk, V.S., A. Ye., Candidate of Physical and Mathematical Sciences.

Card 1/30

Vol'kenshteyn, M.V., and O.B. Ptitsyn. Behavior of Hydrogen Bonds During Vitrification

437

Lazarev, A.N. Vibrational Spectra of Orthosilicic Acid Esters and Their Relation to Silicate Spectra

440

Lotkova, Z.N., V.V. Obukhov-Denisov, N.N. Sobolev, and V.P. Cherenishov. Raman Spectrum of Vitreous Boric Anhydride

445

Sidorov, T.A., and N.N. Sobolev. Infrared Spectra and the Structure of Phosphorous, Phosphoric and Boric Anhydrides

448

Bobovich, Ya. S., and T.P. Tulub. Raman Spectra of Double-complex Silicate Glasses

455

Sevchenko, N.A., and V.A. Florinskaya. Reflection and Transmittance Spectra of Various Modifications of Silica in the Wave Length Range From 7 to 24 Microns

456

Card 264

SEVCHENKO, N.A.

Infrared spectra of tridymite, colored quartz, jasper, and opal  
in the 7, 5-24 micron wave-length [with summary in English]. Inzh.-  
fiz.zhur. 1 no.8:89-94 Ag '58. (MIRA 11:8)  
(Spectrum, Infrared) (Silicates--Spectra)

51-4 -2-8/28

AUTHORS: Sevchenko, N. A. and Florinskaya, V. A.

TITLE: Infrared Transmission Spectra of Porous and Quartz-like Glasses. (Infra-krasnyye spektry propuskaniya poristykh i kvartsoidnykh stekol.)

PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.2, pp.189-195 (USSR)

ABSTRACT: On treatment of glass with acids almost all of  $\text{Na}_2\text{O}$  and most of  $\text{B}_2\text{O}_3$  are dissolved out. The remaining glass contains a high proportion of silicon, and is very porous. Heating of this porous glass to 750-900°C removes porosity and produces quartz-like glass, similar in properties to fused quartz. The present paper reports results of measurement of infra-red transmission of porous and quartz-like (quartzoid) glasses. Three porous and three quartzoid glasses were studied; they were prepared from the following sodium-borosilicate glasses (in molecular %): (1) 10  $\text{Na}_2\text{O}$ , 30  $\text{B}_2\text{O}_3$  and 60  $\text{SiO}_2$ ; (2) 7  $\text{Na}_2\text{O}$ , 25  $\text{B}_2\text{O}_3$  and 70  $\text{SiO}_2$ ; (3) 5  $\text{Na}_2\text{O}$ , 20  $\text{B}_2\text{O}_3$  and 75  $\text{SiO}_2$ . For briefness the glass

Card 1/4

51-4-2-8/23

Infrared Transmission Spectra of Porous and Quartz-like Glasses,  
 compositions will be denoted by: 10/30, 7/23 and 5/20.  
 One untreated 10/30 sodium-borosilicate glass, and  
 glasses of the system  $B_2O_3-SiO_2$  containing from  
 0.5-75 mol.% of  $SiO_2$  were also studied. Porous  
 glasses were obtained by treatment with hydrochloric  
 acid at  $50^\circ C$ . The samples were either thin layers of  
 powders on KCl plates or thin films. Measurements  
 were made using IKS-11 and Beckmann IR-2 spectrometers.  
 At 1-15  $\mu$  a NaCl prism and at 15-24  $\mu$  a KBr prism were  
 used. Fig.1 shows transmission spectra of sodium-  
 borosilicate 10/30 glass. Curves I and II represent  
 powders of transparent and opalescent glass. Spectrum  
 of a film of the same glass is given by curve III.  
 Fig.2 shows spectra of powders of porous glasses  
 10/30, 7/23, 5/20 and quartzoids obtained from them  
 (curves II, IV, VI and I, III, V respectively). Fig.3  
 shows spectra of powders of quartzoid (curve 1) and  
 porous (curve II) 7/23 glasses. Figs. 2 and 3 show  
 that in all porous glasses and quartzoids very strong  
 bands at 9 and 21-22  $\mu$  are observed, as well as medium-  
 intensity bands at 7.2, 12.5 and 10.8  $\mu$ . In addition

Card 2/4

51-4 -2-8/28

Infrared Transmission Spectra of Porous and Quartz-like Glasses.

to these bands porous glasses exhibit also weak bands at 3 and 6.2  $\mu$ . The 9, 12.5 and 21-22  $\mu$  bands are due to silicon in porous glasses. The 10.8  $\mu$  band was also observed in amorphous silicic acid spectra; it is due to vibrations of Si-O-H groups. The latter conclusion agrees with Zhdanov's results (Ref.5) and those reported in Refs.6-8. Fig.4 shows transmission spectra of  $B_2O_3$ - $SiO_2$  glasses in the form of films containing 0.5 to 75%  $SiO_2$ . In all these glasses two bands are observed: at 9 and 7-8  $\mu$ . The 9  $\mu$  band coincides with the fundamental band of free silicon (Ref.3): the 7.2  $\mu$  band is due to boron. The authors thank Academician A.A. Lebedev and G.A. Vlasov for their help and advice. They also thank O.S. Molchanova, S.E. Krasilov and G.A. Kolykov for supplying the glasses and assistance in the work. There are 4 figures, 10 references of which 9 are Soviet and 1 English.

ASSOCIATION: State Optical Institute imeni S.I. Vavilov.  
Card 3/4 (Gos. opticheskiy institut im. S.I. Vavilova.)



51-4-2-8/28

Infrared Transmission Spectra of Porous and Quartz-like Glasses.

SUBMITTED: April 9, 1957.

1. Porous glass-Infrared spectra
2. Glass-Infrared spectra
3. Infrared spectrum analyzers

Card 4/4

51-4-2-13/28  
AUTHORS: Sevchenko, N. A. and Florinskaya, V. A.  
TITLE: Reflection Spectra of Crystalline Quartz Plates, Cut  
at Various Angles with Respect to the Optical Axis,  
in the 7-24  $\mu$  Wavelength Region. (Spektry otrazheniya  
plastinok kristallicheskogo kvartsa, vyrezannykh  
pod razlichnymi uglami otnositel'no opticheskoy osi,  
v oblasti dlin voln 7-24  $\mu$ .)  
PERIODICAL: Optika i Spektroskopiya, 1958, Vol.IV, Nr.2, pp.261-264  
(USSR)  
ABSTRACT: The present paper reports on the reflection spectra of  
plane-parallel disks (1.5 mm thick) of crystalline  
 $\alpha$ -quartz, cut at 0, 20, 45, 70, 80, 90° to the optical  
axis, in the 7-24  $\mu$  region. Reflection was measured  
on an IKS-11 spectrometer using rock-salt and potassium  
bromide prisms. A vacuum thermoelement with a Kozyrev  
amplifier was used as the receiver. Measurements were  
made in non-polarized light at an angle of incidence close  
to 25°. Reflection from samples was compared with  
reflection at an aluminium mirror. Scattered light  
was removed by means of thick plates of glass, and LiF  
placed in the light beam. Figs.1 and 2 show the

Card 1/3

51-4-2-19/28

Reflection Spectra of Crystalline Quartz Plates, Cut at Various  
Angles with Respect to the Optical Axis, in the 7-24  $\mu$  Wavelength  
Region.

reflection curves in the regions 7.5-16 and 17.5-24  $\mu$  respectively. In a table on p.264 the wavelengths of the reflection maxima are given for all the samples studied. A fundamental band, which is a doublet with maxima at 8.50 and 8.95  $\mu$ , was found to have practically the same position and intensity in all the crystals studied. The position of a second fundamental band at 12-13  $\mu$  (also a doublet) is the same for all cuts but its intensity varies considerably from sample to sample. Another band at 14.53  $\mu$  (characteristic of the quartz lattice) is found to have the same position in all curves of Fig.1 but its intensity varies with variation of the crystal cut. The angle of cut has the greatest effect on long-wavelength bands at 18-19.5 and 19.5-24  $\mu$ . The latter two bands change both their position and intensity with variation of the angle of cut of quartz crystals. The authors thank A.A. Lebedev and A.G. Vlasov for advice and help. There are 2 figures, 1 table and 6 references, of which 1 is Soviet,

Card 2/3

51-4-2-19/28  
Reflection Spectra of Crystalline Quartz Plates, Cut at Various  
Angles with Respect to the Optical Axis, in the 7-24  $\mu$  Wavelength  
Region.

1 Belgian, 2 German and 2 American.

ASSOCIATION: State Optical Institute imeni S.I. Vavilov.  
(Gos. opticheskiy institut im. S.I. Vavilova.)

SUBMITTED: May 10, 1957.

1. Quartz crystals-Reflection spectra-Measurement Applications
2. Spectrometers-

Card 3/3

SOV/61-5-1-4/19

AUTHORS: Sevchenko, N.A. and Florinskaya, V.A.

TITLE: The Transmission Spectra of Quartz Glass in the Region 2-24  $\mu$ .  
(Spektry propuskaniya kvartsevoogo stekla v oblasti 2-24  $\mu$ )

PERIODICAL: Optika i Spektroskopiya, 1958, Vol 5, Nr 1, pp 23-28 (USSR)

ABSTRACT: In the study of structure of vitreous silica the infrared spectra of silica were measured in the process of transition of the latter from its crystalline to glassy state. Quartz glasses were obtained by melting crystalline Brazil quartz under the same experimental conditions but at different temperatures of 1720-1740, 1750-1800, 1800, 1850 and 1900°C. These quartz glasses were prepared by N.F. Orlov in Professor V.V. Vargin's laboratory. The glass when molten was held at the highest temperature for 30-40 minutes and was not subjected to annealing after preparation. On melting of the Brazil quartz at 1720-1740°C and subsequent cooling a powder was obtained while in all the remaining cases quartz glasses were produced. Samples were in the form of layers of very fine powder on sylvite base. Transmission was measured in the region up to 13  $\mu$  using a Beckmann spectrophotometer with a NaCl prism. For measurements at 13-15 and 15-24  $\mu$  the IKS-11 spectrophotometer was used with NaCl and KBr prisms.

Card 1/3

The Transmission Spectra of Quartz Glass in the Region 2-24  $\mu$ . SCV/51-5-1-4/19

The technique of measurements is described in greater detail in Refs 1 and 2. Figs 1-3 show the transmission spectra of powders in the region of the fundamental absorption bands of silicon at 11.5-13, 14-15, 18-24  $\mu$ . The curves in Figs 1-3 refer to the following substances: 1 -  $\alpha$ -quartz; 2 - glass melted at 1720-1740°C; 3 - glass melted at 1750-1800°C; 4 - glass melted at 1800°C; 5 - glass melted at 1850°C; 6 - glass melted at 1900°C; 7 - glass produced by melting Aldan quartz at 1900°C; 8 - glass made by the Hereus Company in powder form; 9 - a film blown from the Hereus glass. Figs 4 and 5 show the transmission spectra of damaged quartz glass at 11-15  $\mu$  and of silica at 3  $\mu$  respectively. The quartz glass spectra were found to be complex because of incompleteness of destruction of the quartz lattice on melting. In spite of the fact that each glass was held at its maximum temperature for 30-40 minutes, the transmission spectra contained bands characteristic of the quartz lattice (doublet at 12-13  $\mu$  and bands at 14 and 19  $\mu$ ). Other reasons for complexity

Card 2/3

SOV/ 51-5-1-4/19

. The Transmission Spectra of Quartz Glass in the Region 2-24  $\mu$

of the quartz or glass spectra advanced by the authors are the presence of polymorphic forms in the original crystalline quartz and the presence of Si-O-H groups in the glasses. The authors thank A.A. Lebedev and A.G. Vlasov for their advice. There are 5 figures and 6 references, 4 of which are Soviet, 1 Belgian and 1 German.

ASSOCIATION: Gosudarstvennyy opticheskiy Institut im. S.I. Vavilova (State Optical Institute imeni S.I. Vavilov,

SUBMITTED: June 28, 1957

Card 3/3

1. Quartz - Spectrographic analysis
2. Quartz - Thermal factors
3. Spectrophotometers - Applications

SEVCHENKO, N.A.; FLORINSKAYA, V.A.

Infrared transmission spectra of porous and quartzoid glasses.  
Opt. i spektr. 4 no.2:189-195 F '58. (MIRA 11:4)

1.Gosudarstvennyy opticheskiy institut im. S.I. Vavilova.  
(Glass--Spectra)



SAVULESCU, Alice, acad.; DUMITRAS, Lucretia; SEVCENCO, Victoria;  
VASILIU, Lia

Research on the resistance of the different kinds of wheat to  
the attack of the *Tilletia nanifica* (wagn.) Savul.  
(*T. contraversa* Kuhn.) fungus, and the effect of some chemical  
substances in the fight against this parasite. *Studii cerc biol*  
*veget* 15 no.2:163-173 '63.

SEVCIK, A.

Atoms for peace. Jaderna energie 10 no. 5:151 My '64.

**Oscillographic polarography with periodical triangular voltage.** A. Sevcik. *Collection Czechoslov. Chem. Commun.* 13, 348-77 (1948) (in English). - Oscillographic current-voltage curves are produced by charging and discharging the dropping-Hg electrode linearly with time by means of a specially constructed app. which generates periodically altered voltage with the wave form of an equilateral triangle. The voltage applied to the polarizable Hg electrode is registered on the horizontal and the current flowing through the cell is registered on the vertical axis of the screen of the cathode-ray tube. The curves present abrupt max. at crit. voltages and then a gradual decrease with time (or increased voltage). Each complete cycle gives one cathodic and one anodic branch, the comparison of which serves to indicate the reversibility of the electrode processes. The course of these oscillographic current-voltage curves has been deduced mathematically (a) by the intuitive method and (b) by using the operator calculus with the Laplace transformation. For the max. of the diffusion-controlled current,  $I_{max}$ , the following equation holds:  $I_{max} = nFqB\sqrt{D\omega}$ ,  $nFgR/0.301\delta$ , when  $\delta$  is 1 sec.<sup>-1</sup>; here  $n$  is the no. of electrons,  $F$  is Faraday's const.,  $q$  is the electrode surface,  $B$  is the concn. of oxidant,  $D$  is its diffusion coeff.,  $R$  is the gas const., and  $\omega$  is the rate of change of the potential. Experimentally it could be shown that in diffusion-controlled, reversible reactions (up to frequencies of 100 cycles per sec.)  $I_{max}$  was (a) proportional to  $\sqrt{B}$  (over a range of  $10^{-2}$  to  $10^{-3} N$ ), (b) proportional to  $\sqrt{\omega}$ , and (c) proportional to  $\sqrt{e}$ . From the potential at which the current is maximal the half-wave potential is calculated by adding 40 mV. in the case of the cathodic curve and by subtracting the same amt. from the potential of the max. on the anodic curve. The electrode reaction is reversible only if the two half-wave potentials thus found are identical. This was the case in the analysis of solns. containing

Pb<sup>2+</sup>, Cd<sup>2+</sup>, or Tl<sup>+</sup>. In electrode reactions which are slow and no longer diffusion-controlled the max. of the current is flattened or disappears entirely. This phenomenon is used to study the effects of (a) frequency, (b) concn. of the indifferent electrolyte used, and (c) surface-active substances (gelatin). Otto H. Muller

B 64  
+

SEVCIK, A.  
SA

621.311.18(43)1

1940. From the regulation of supply at overload periods of power stations to the planning of maximum energy requirement. *Soviet A. Elektrotech.*, Obz., 38, 176-81 (March 25, 1949) In Czech.—The paper is based on statistical data collected in Bohemia and Moravia and Slovakia between the winter of 1946-47 and summer 1948. The 3 countries, in spite of the quite different economic character, show rather surprisingly small differences in the overall distribution of relative loading during the day. The planning of requirements is shown with reference to typical examples for individual plants. B. F. K.

ASH-SLA METALLURGICAL LITERATURE CLASSIFICATION

GROUPS

ILLUSTRATIONS

REMARKS

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SO: Monthly list of East European Accessions, LC, Vol. 3, No. 5, May 1954, Unclassified.

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Tasks of railroads in our power economy. p. 94.  
French railroads under American control. p. 95.  
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SO: Monthly List of East European Accessions (EEAL) LC, Vol. 5, No. 6, June 1956 Uncl.

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Vol. 3, no. 6, 1955  
SOVETSKA VEDA: ENERGETIKA  
Praha, Czechoslovakia

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